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# MAKING LOG CABINS ENDURE

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## MAKING LOG CABINS ENDURE

### SUGGESTIONS ON PRESERVATIVES, CHINKING, AND EXTERIOR AND INTERIOR FINISHES

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Log cabins in these days are built mostly for summer homes and recreation purposes although, in wooded sections of the country that are sparsely settled, the building of log cabins for year-long homes has not entirely ceased. Whatever the purpose, few people care to put up a cabin that will begin to rot in a short time but, because of insufficient knowledge, many a cabin is built in such a way that early decay is almost certain. The avoidance of decay is not difficult and it seems surprising that so little attention is given to it. The purpose of this report is to point out some simple precautions that may be taken to insure long life. No attempt is made here to present a complete discussion of log cabin design or details of construction. The list of references at the end of this report<sup>1</sup>, however, includes a number that relate to design and construction.

#### Foundations

Of first importance is the foundation. The easy thing to do, and too frequently the thing that is done, is to lay the bottom logs directly on the ground. A little reflection should disclose the hazard this entails for there are few people unaware of the fact that placing wood in direct contact with the ground is one of the surest ways to hasten its decay. The soil moisture has direct access to the wood and keeps it damp, making conditions very favorable for the growth of the fungi that cause decay. The rate at which the decay will progress will depend upon the natural decay resistance of the wood used and upon the dampness of the site. Logs of some species, such as cedar, are very decay resistant and their heartwood will last a long time even under unfavorable conditions. Since the decay resistance of durable species is only in the heartwood, however, longest life can be expected from logs of these species containing the least sapwood. Aspen, on the other hand, is one of many species that have little resistance to decay either in the heartwood or sapwood. In dry climates and dry situations, decay will be slower than where there is more moisture. In any case, contact with the ground should be avoided.

Good practice requires that the bottom logs or sills be kept a foot or two above the ground on foundations that will keep the wood dry. Stone or concrete is excellent. Brick piers or posts of highly decay-resistant

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<sup>1</sup>Numbers in parentheses refer to publications listed at the end of this paper.

wood may also be used to advantage except in termite-infested ground. Good ventilation beneath the floor is important because it keeps the soil and the wood dry. Foundation posts or piers allow good ventilation unless the spaces between them are filled solid. Screen or lattice work between the piers will improve the appearance, keep animals out, and trash from accumulating and still allow good ventilation. Wood lattice, unless of decay-resistant wood, should not be close to the soil. If solid foundation walls are preferred to piers, generous openings should be provided at frequent intervals to allow good air circulation. If the building is to be used throughout the year where cold temperatures prevail in winter, good ventilation will make cold floors in cold weather. This may be prevented by boarding up the openings in cold weather but leaving them open during the rest of the year.

### Drainage

An important aid to keeping the foundation dry is good drainage. If possible the site should be graded or ditched so that water drains away from the building and not towards it. Storm water should not be allowed to accumulate around the foundation or under the building. Wide eaves are another safeguard. By their protection both the walls of the building and the foundation are kept dry in all but driving storms. Eave troughs, provided with downspouts that direct the water away from the building, add to the effectiveness of wide eaves.

In putting up the walls and framing the window and door openings, care should be taken to avoid forming crevices where water can accumulate and soak into the wood. Storm water does little harm to the building if it can run away quickly, but if caught in joints, crevices, or checks where it cannot drain out it will soak into the wood and dry out very slowly. The wood may in this way become so wet in spots that decay sets in.

### Termites

In some parts of the country termites, or "white ants", are very troublesome. The ground-inhabiting termites are the most plentiful and most important type. They enter the wood from the ground and honeycomb the interior, eventually destroying it. Since they leave an outside shell of wood intact when working above ground they may do a great deal of damage without being discovered. Wood in contact with the ground falls easy prey to these insects, but by taking proper precautions their attacks can be prevented. Masonry or similar foundations 18 to 24 inches high and free from cracks are helpful, just as in preventing decay, and may be sufficient except in places where the termites are especially active. In using bricks, however, the mortar must be especially hard or the termites will tunnel through it. In places where termites are very active they may, if undisturbed build mud tunnels up over the foundation, or through it, until

they can enter the wood above. Metal shields over the foundation and extending out from it seem to be impassable to termites and may be used just beneath the wood. Detailed information about termites and their habits and how to avoid their destructive activities may be obtained from the U. S. Bureau of Entomology and Plant Quarantine (23), Washington, D. C.

### Bark Beetles

Peeled logs are somewhat less liable to decay than logs with the bark on, but either kind may be used successfully. Bark harbors bark beetles and retards moisture evaporation. Once the logs are dry the bark does not favor dampness except where some faulty condition allows water to accumulate in the wood under the bark. The choice between peeled or unpeeled logs is largely a matter of personal preference, but if logs with the bark on are preferred some attention must be given to keeping the bark from loosening in patches and falling off. Perhaps the principal cause of the loosening of bark is the activities of certain types of insects called bark beetles. The adults of these insects lay their eggs within or just beneath the bark, usually when the logs are fresh cut. When the larvae hatch they make tunnels beneath the bark and if they are present in sufficient numbers the bark may fall off in great pieces. One way to prevent such trouble is to cut the logs in the winter when insects are least active and then spray the bark on all sides with some toxic or repelling material that will keep the adult insects from depositing their eggs in the bark. A mixture of 1 part coal-tar creosote and 3 parts kerosene has been used with good effect. The Bureau of Entomology and Plant Quarantine has issued a very useful bulletin on this subject (20). Dampness and decay beneath the bark will also loosen it. Keeping the logs dry prevents decay and helps to keep the bark on.

### Powder Post Beetles (22)

Peeling the logs as soon as they are cut avoids the attack of bark beetles and most other insects, but there are a few insects that will attack peeled logs, especially hardwood logs, after they become dry. The so-called powder-post beetles work in the sapwood of dry hardwood logs (occasionally in softwoods also) making numerous small holes and sometimes are plentiful enough to do considerable damage. They can be killed by applying kerosene, orthodichlorobenzene, solutions of paradichlorobenzene or other suitable chemicals to all the affected parts. This requires care and patience, but may become necessary. If a building becomes heavily infested with them the advice of the Bureau of Entomology and Plant Quarantine should be sought.



## Preservative Treatment (24,25)

If a log cabin is properly constructed and maintained, it should have satisfactory life without preservative treatment and it will usually be unnecessary to undergo the expense and inconvenience of applying preservatives. When maximum insurance against decay and insect attack is more important than low cost, however, preservative treatment is in order.

For greatest effectiveness, preservatives must be impregnated into the logs before the cabin is built and before the logs are infected. It is of little use to apply a preservative to the surfaces of the logs of a cabin after the structure is erected because the preservative can then reach only the exposed surfaces and these are the least likely to be attacked. The danger points are the hidden surfaces in the joints and points where the logs are in contact with each other or with other parts of the building such as window and door frames, or foundations. It is in these places that water is most likely to collect and cause decay but these are the places that preservatives do not reach when applied by ordinary methods after the building is erected.

### The Cold-soaking Process (3)

A convenient nonpressure method which can be used for the preservative treatment of peeled, seasoned logs for cabins consists of cold-soaking in unheated, light oil solutions containing 5 percent pentachlorophenol. Preservatives of this type are sometimes referred to as NSP (nonswelling, paintable) since they do not swell the wood and since with suitable solvents the treated wood can be painted. Easily treated woods such as sapwood pine can be well penetrated and logs of such species will absorb sufficient preservative, after soaking periods of 48 hours or longer, to have good protection against decay and insects. NSP preservative is also effective in preventing blue stain and will retard mold growth on the surface of the logs. Treatments for this purpose are described in later sections of this publication.

Before treating logs by this process all cutting or framing should be completed. The solvents used in the treating solution should preferably be of a volatile type such as mineral spirits or Stoddard solvent. The treated logs should be open piled for several days before they are used in the building, to give the solvents an opportunity to evaporate. Otherwise their presence may cause an objectionable odor and may tend to create a fire hazard in the building.

### Pressure Treatment

Treatment of the peeled logs in pressure treating cylinders by the methods in common use for treating poles and structural timbers (25) is one of the most effective methods of protection but pressure treatment is

seldom available to the prospective cabin builder at reasonable cost. Possible arrangements for treatment of cabin logs can be determined by inquiries directed to commercial preserving plants.

#### Treatment of Logs with the Bark On

There are several methods by which logs with the bark on can be impregnated with water solutions of preservatives. Such treatment not only protects against decay and insects but it also helps to avoid loosening of the bark.

Boucherie hydrostatic treatment.--This method, long used in Europe for the treatment of poles, consists in forming a small, pressure-tight chamber over the large end of a freshly-cut pole or log with bark on and conducting into this chamber a water solution of some suitable preservative from a solution tank 20 or 30 feet higher than the end of the pole. The log is usually placed on skids with the large end a foot or two higher than the small end but it may be merely lying on the ground. The hydrostatic pressure developed by the column of liquid is sufficient to force the preservative solution through the log and thus completely penetrate the sapwood in a few days or a week.

Modern adaptations of this form of Boucherie treatment, which are finding limited use in some parts of the country, provide improved methods of forming the pressure chamber over the end of the log and forcing the preservative through the log by air pressure, thus materially shortening the time required for treatment.

A somewhat simpler method, suitable for small logs consists in forming the solution chamber by attaching a section of tire inner tube to the log and pouring the preservative into that (29). This method is not recommended for logs longer or larger than the common fence post sizes because of the uncertainty of getting sufficiently uniform distribution of the preservative in large material.

Tree treatments (27).--The original Boucherie treatments were applied to standing or freshly-felled trees with the branches on. The U. S. Bureau of Entomology and Plant Quarantine has revived and worked out several important improvements in these methods that are simple and are well suited for the treatment of small logs for cabins and other rustic structures. The method is most useful for logs of 6 inches in diameter or less for, in larger sizes, there is much less certainty of getting good distribution of the preservative in the sapwood. Instructions for treating by these methods should be obtained from the above-named Bureau. One process consists in making a suitable groove through the bark and into the sapwood of the standing tree and attaching a container of preservative solution in such a way that the preservative is drawn up into the sapwood of the tree by the evaporation of moisture from the tree's foliage. With trees that are not too heavy to lift, the same result can be accomplished by merely standing the tree in a container of preservative solution. Another method is to attach one end of a section of tire inner tube to the butt end of a

freshly-felled tree (with branches on), support the loose end of the tube so it will hold preservative without spilling, and fill in with the preservative solution.

Although the Boucherie treatments are made while the bark is still on the tree, the logs may be peeled afterward, if desired.

Steeping treatment (28).--This method of applying water-soluble preservatives consists merely in soaking the logs for a week or so in a tank of the preservative solution. The logs must be peeled before treatment but they may be either green or at any degree of seasoning.

Preservative paste method.--Another method of treating green logs consists in applying the preservative in paste form to all surfaces of the green peeled logs, then piling the logs closely together, covering the pile tightly with "waterproof" paper, and allowing the pile to stand for a month or more. If the wood is thoroughly green to begin with and the work is well done, very substantial penetrations are obtained. This is a patented or proprietary method for which the preservative and instructions for its use can be obtained from the proprietor, whose name will be furnished upon request.

Treatment of cut surfaces.--Logs treated by any of the methods described will have to be trimmed and cut in various ways in fitting them into the structure. Such cutting will usually expose the untreated wood within the logs and provide easy entrance for decay or insects. All cut surfaces should, therefore, be retreated by brushing them generously with strong solutions of the preservative used in the original treatment.

Blue stain and mold prevention.--When logs are cut during warm, humid weather, molds and blue stain may develop rather rapidly on the ends and cut surfaces and discolor them to an undesirable degree before sufficient seasoning takes place to stop the growth. These stains do not damage the logs appreciably, except when it is desired to retain a bright, new appearance.

Staining and molding can usually be avoided by cutting and peeling the logs during cold weather and piling them so that the air can circulate freely around each piece. By the time warm weather arrives, the logs should be sufficiently seasoned on the surface to avoid subsequent development of mold or stain. When logs must be cut and peeled during weather that is favorable to the development of blue stain and mold, assurance against stain and mold can usually be attained at reasonable cost. Generous application of commercial sap stain preventives (21) by brushing or spraying should prevent or greatly reduce the discoloration, if done immediately. If application is delayed a day or two after the logs are cut, during weather favorable to staining, it may be too late.

After blue stain has developed in logs, there is no practical way to remove the discoloration but it may be hidden by subsequent use of paints or dark stains. If the discoloration has been produced by surface growth only, it may be possible to remove it by brushing or drawshaving.

### Selection of Preservative

Although there are many preservatives (24) that are effective in preventing decay and insect attack, not all of them are suitable for treating



the logs of cabins. When treatment is made by an end pressure method and the bark is left on the logs, practically any water-borne preservative may be used because the color, except at the ends will be concealed by the bark. Preservative oils cannot be used by end-pressure methods because they do not penetrate far enough endwise in either green or seasoned wood.

If the treated logs are to be peeled or if peeled logs are to be treated some attention should be given to the color of the preservative in making a choice. If the logs are to be left without finish to weather to a natural gray, or are to be stained a dark color after the building is erected, practically any of the water-borne preservatives may be used but if the bright new appearance of freshly peeled wood is desired, preservatives that are highly colored should not be used. Creosote, of course, is very dark and is unsuitable to use when light color is required. Zinc chloride, sodium fluoride, and the chlorinated phenols are practically colorless and among the preservatives least likely to change the color of the logs.

### Chinking

One of the most practical methods of chinking, according to C. K. Spaulding, Forest Service, U. S. Department of Agriculture, is to staple 2-inch strips of metal lath on the outside of the cracks and to use standard chimney mortar, consisting of two parts Portland cement, one part dry hydrated lime, and six parts clean, sharp, screened sand. It is necessary that this mortar be mixed in small batches to prevent hardening before it can be applied.

H. G. Thuesen, Oklahoma Agricultural and Mechanical College has reported favorably on a method using spar varnish, linseed oil, and mineral wool of the kind sold in batts for use as heat insulation. Varnish is applied between the logs. Before it dries, rock wool is tamped in place with the end of a board about  $3/8$  inch thick and 6 inches wide. Varnish or linseed oil is applied to the exposed surface of the rock wool, by sweeping the brush over the surface quickly to avoid deep penetration of the liquid. A brown rock wool can be used on the outside and white on the inside of the building, if desired. The chinking adheres tenaciously to the logs. It has enough elasticity to compensate for log shrinkage except where the logs have twisted badly. Where the chinking has broken loose because of such twisting, it can easily be tamped back into place. Insects and rodents are not inclined to attack chinking of this kind.

The use of split chinking on inside walls is objectionable because of its unsightliness, and the use of small poles because of the dust-catching grooves above and below the pole. The small poles were also found to tend to split and pull away from the nails while seasoning. Other methods of making tight joints include the use of oakum or moss driven tightly between the logs, the use of commercial caulking or filling compounds, cutting deep grooves accurately in the top and bottom surfaces of each log and inserting a spline, hollowing out the under side of each log carefully to fit the log beneath, and variations of these methods.



## Finishes

One of the most common questions raised concerning log cabins is "What is the best finish to use to preserve the logs?" As previously stated, the finishes used have practically no value in preserving the logs from decay and they are only slightly more useful in protecting against certain insects. The use of a finish, therefore, should be considered solely from the standpoint of appearance. If the color and surface of unfinished logs is acceptable to the owner, he may very properly use no finish either inside or outside the cabin. If left unfinished, the exterior surfaces of peeled logs will gradually darken and ultimately assume the natural gray of weathered wood, a color that is quite in order in rustic surroundings. This is by far the cheapest "finish" because it requires no maintenance or upkeep.

Interior finishing.--The interior of a cabin, when left unfinished, gradually darkens in color and becomes soiled but does not become weathered or gray. Perhaps the greatest disadvantage of leaving the interior unfinished is that doors and other woodwork frequently touched by the hands will become spotted in time and cannot easily be cleaned. Soot from an open fireplace or other source of smoke may also gather on and discolor unfinished wood. When an interior finish is desired, the choice is entirely up to the owner for there is no "best" interior finish for log cabins. Any finish that is used on the woodwork of ordinary homes may be used in cabins, according to the personal preference of the owner.

The rubbed linseed oil finish is one of the easiest to apply and to maintain. Several applications of boiled linseed oil are used in the following manner: Apply the oil as generously as practicable by brushing. Allow it to stand for about an hour to sink into the wood and then wipe off any excess oil remaining on the surface with clean rags, rubbing vigorously to bring up a polish. Let at least 24 hours elapse between applications for thorough drying of the oil. (Burn oily rags promptly after use or keep them in tightly closed metal containers until disposed of because they may take fire spontaneously.)

Instead of boiled linseed oil, one of the modern floor seals or wood seals of good quality may be used in much the same way. One or two applications of floor seal should suffice. The floor seals may be buffed with No. 2 steel wool instead of the rubbing with rags. The buffing should be done before the seal has had time to dry or to become "set" to the point of "gumming up" the steel wool badly. The proper time between application and buffing varies for the different seals on the market, and should be indicated in the directions printed on the label. If desired, furniture wax or floor wax may be applied for final polish and for maintenance over either the rubbed linseed oil or the floor seal finish.

Shellac varnish may also be used as a seal finish. One coat of shellac varnish may suffice. It dries very quickly and is buffed with No. 2 steel wool after it has dried. It should then be waxed.

After finishing by any one of these methods the wood seems to be darker in color than it was before finishing. There is no way of finishing that does not cause some change in color. Moreover, there is usually a continued darkening in color as time passes which comes largely from the action of light on the wood. This darkening effect of light on new wood can be shown quickly by laying one new board across another for a few days in bright sunlight. The covered part of the under board will be found considerably lighter than the exposed parts. Indoors the darkening goes on less rapidly because there is weaker lighting but it may show up when a picture or other object is moved after hanging for a long time in one place on the wall. Besides the darkening of the wood there is also a darkening from the action of light and air on the oil or seal finish. Of the three finishes described so far, shellac darkens less than the floor seals, and linseed oil darkens somewhat more than most good floor seals. Shellac, however, does not stand exposure to water or very high humidity so well as floor seal or linseed oil because the shellac may turn white.

If it is desired to change the color of the wood a stain may be used in connection with any of the above finishes. The stains available in retail paint stores and familiar to painters are usually oil stains. The stain may be applied to the bare wood, allowed to dry, and then the oil, seal, or shellac finish may be applied as already described. On softwoods, however, the difference in absorption of stain by springwood and summerwood may produce too much contrast in color. To get a more uniform staining one application of linseed oil or wood seal may be made in the manner described, then the oil stain may be put on and rubbed with rags just as is done with the oil. A third application of oil or seal is then advisable. When the seal finish is being used the oil stain may be mixed with the seal for the first application. Some brands of floor seal come in colors as well as in the plain, uncolored form.

A finish of very light color can be made as follows: First make one application of linseed oil or of seal. Next mix some white, ivory, or cream-colored house paint (enamel is still better) with the linseed oil or the seal in the proportion roughly of 1 part of paint to 3 parts of oil or seal by volume. Apply the mixture by brushing and after 20 to 30 minutes wipe off the excess with clean rags. Enough paint should be left in the surface of the wood to lighten the color materially but not enough to give a painted effect. A third application of clear oil or seal is then advisable.

Before starting to apply any stain or other finish containing color it is advisable to try out the proposed finish on samples of the kind of wood under consideration. Cuttings left over by the carpenter are excellent for the purpose. By experimenting with such samples the strength of the stain or the mixture of stain with oil or seal can be varied until the desired effect is produced. Once the application of stain to the woodwork has been started it is difficult and sometimes impossible to correct mistakes.

If a full varnish finish is desired it can be obtained, of course, by applying three coats of interior varnish of good quality. The varnish

is brushed on evenly and merely allowed to dry because the object is to build up a coating over the wood. Varnish forms a glossy coating entirely different in appearance from the oil, seal, or shellac finish. If the high gloss is objectionable it can be modified by rubbing the last coat with pumice stone and oil after it is thoroughly dry. This rubbing operation is somewhat difficult for the inexperienced. To avoid it a so-called flat drying varnish may be used for the last coat, though the effect is not so satisfactory as that of a hand-rubbed finish when done skillfully.

Stain may be used in conjunction with varnish, following the procedures already described for use of stains with oil or seal finishes.

Interior woodwork may also be painted if desired. For this purpose two products should be used, an enamel undercoater and an interior paint. Both should be made by the same manufacturer for use together. On new woodwork the undercoater should be used for the first coat. The last coat should be the interior paint. One coat of each may suffice if the products have good hiding power. If three coats are needed or are desired for a job of better quality, the middle coat may be one of the undercoater, a mixture of equal parts of undercoater and interior paint, or the interior paint. On this point the directions given by different manufacturers vary from one another and it may be wise to follow those given on the labels of the products used.

Interior paints are made in three degrees of gloss, namely, high gloss, eggshell (low gloss), and flat (no gloss). Choice between them is largely a matter of personal preference, but as a rule high gloss paints, which may be selected for the trim, are not desirable for large areas of wall or ceiling because they reflect light harshly. Semigloss or flat paints are suitable for large areas.

Exterior finishing.--Next to leaving the exterior of the cabin unfinished, the simplest and least expensive procedure is to apply a dark stain. This may be ordinary coal-tar creosote or any dark stain that is ordinarily used for buildings such as shingle stain. Whatever stain is used, it is important to try it on a few extra pieces of wood first to see whether the appearance is acceptable. Preliminary trial of creosote is particularly important because some creosotes leave a "muddy" color that is very unattractive. Others leave the wood a dark brown at first and then gradually change to a reddish brown in the course of a few months. A good stain is very durable and need be renewed as a rule no more often than once in 4 or 5 years.

Many cabin owners try to retain the bright, new appearance of freshly-peeled logs by using transparent finishes. As already pointed out, the wood itself darkens in color under the action of light, and this change in color cannot be prevented even with transparent finishes. Weathering and graying can be prevented, however, and an appearance of newness retained by keeping the logs oiled or varnished. The transparent finishes are not durable out-of-doors and must be renewed frequently. If the cabin stands in the open fully exposed to sunshine it may need renewal of the transparent finish at intervals of 6, 12, and 18 months and annually thereafter. If the cabin is well shaded by trees renewal once a year may suffice.



Transparent finishes offer only a moderate degree of protection against absorption of moisture by wood and afford little or no resistance to the growth of fungi. As a result there is sometimes darkening in appearance from the growth of blue staining fungi in sapwood, which shows through transparent finishes, or from growth of molds on the surface of the finished wood. Such discoloration is most pronounced on the parts of the structure exposed to severe dampness. Several courses of logs nearest the ground may be affected.

The treatments described in the section on "Blue stain and mold prevention," for immediate application to green logs, may not be permanent enough to prevent blue stain in subsequent service and are not effective in preventing mold growing on the surface of finishes. Application of NSP preservatives (6) or water-repellent preservatives (6) after the logs have seasoned usually helps greatly in preventing blue stain and keeping a bright appearance. Addition of preservative to the oil or varnish finish is effective in preventing growth of molds on the surface. NSP preservative or water-repellent preservative, when used only for the purpose of preventing blue stain and surface mold, can be applied by dipping after all cutting and fitting has been done but before the logs have been placed in position. In that way treatment is applied to surfaces that are inaccessible after erection. If untreated logs have already been erected, preservative may be applied by brushing or by spraying, but ends of logs should be given several applications because they absorb preservative readily and need more protection than other parts of the surfaces. Treated wood should be allowed to stand at least two days, preferably a week or more, before surface finishes are applied. If a definite decay or insect hazard exists, treatment is required that assures good penetration and good absorption of the preservative.

The most readily available transparent finish is the boiled linseed oil finish applied exactly as has been described for interior finishing except that the final waxing often used for interior finish is usually omitted out of doors. As a further precaution against molds growing on the surface, addition of 5 percent by weight of pentachlorophenol to the linseed oil is desirable. Concentrated solutions of pentachlorophenol in suitable solvents can be purchased which can be readily mixed with linseed oil in the proportions required to give 5 percent of the preservative in the mixture.

In place of linseed oil one of the preservative wood sealers sold under proprietary brand names may be used. Such products are essentially special kinds of varnish made to penetrate slightly into the surface of wood to which the manufacturer has added a suitable preservative such as pentachlorophenol. The wood sealers may be somewhat more durable than linseed oil.

A finish of unusually light color can be maintained by incorporating a little white pigment in the first application of boiled linseed oil or of wood sealer, following essentially the procedure already described for interior finishing.

The varnish finish is occasionally used on the exterior of log cabins or of "log cabin" siding but the effect produced is usually considered undesirably artificial and inappropriate for the rustic environment. Where the varnish finish is desired, however, three coats of a good spar varnish should be applied. Spar varnishes are always made to dry with a high gloss and it is not customary to attempt to produce the rubbed varnish finish with them. The durability of the spar varnish finish is about the same as that of the other transparent finishes; that is, renewal of the varnish at least once a year should be expected. After a number of renewals of varnish, it may become necessary to take off all old varnish with varnish remover before revarnishing.

Oil or sealer finishes, if correctly applied and maintained, need never develop alligatoring, loosening from the surface, cracking, or peeling as varnish finishes eventually do. For that reason it should never be necessary to remove old oil or sealer finish before refinishing. To make sure that such is the case, however, care should always be taken in applying oil or sealer to see that no more is put on than the surface of the wood will absorb. If any excess remains on the surface it should be wiped off before it has had time to dry.

Log cabins, of course, can be painted with house paints just like any other exterior woodwork. The effect of paint, however, is more formal than that of the stained or the oil finishes and for that reason many owners of log cabins feel that the paint finish is inappropriate for the rustic environment which the log cabin itself suggests.

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